ISSUED: February 13, 2004

D.T.E. 02-46

Petition of the Town of Framingham for a determination of the rates applicable to the transportation and treatment of sewage pursuant to an intermunicipal agreement with the Town of Ashland.

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TABLE OF CONTENTS

I. INTRODUCTION

A. Procedural History

On August 8, 2002, the Town of Framingham ("Framingham") filed a petition with the Department of Telecommunications and Energy ("Department"), requesting that the Department determine the charges to be paid by the Town of Ashland ("Ashland") to Framingham to transport Ashland's sewage through Framingham's sewerage system to the Massachusetts Water Resources Authority's ("MWRA") Framingham Extension Sewer ("FES"). The parties stipulate that the Department has jurisdiction over this matter pursuant to St. 1946, c. 86, § 1 ("Special Act"), as amended by St. 1960, c. 406, § 1.

The Special Act provides, in part:

> The town of Ashland may enter into an agreement with the town of Framingham for the joint use of the sewerage facilities of the town of Framingham to receive and treat the sewage of the town of Ashland, and shall pay such proportion of the cost of construction of additional works required and such annual charges for the transportation and treatment of sewage as shall be mutually agreed upon by the two towns. If said towns shall be unable to agree as to the proper and just sum which shall be paid by the town of Ashland to the town of Framingham, either such town may apply to the [Department] for a determination of the matter in controversy.

Special Act, § 1. The Department takes official notice of the Special Act.[1] The Special Act authorizes but does not require the Towns to enter into an agreement. On December 9, 1963, pursuant to the Special Act, Framingham and Ashland entered into an intermunicipal agreement ("IMA") for Ashland's use of Framingham's sewerage system (Exh. FR-14).

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[1] 220 C.M.R. § 1.10(2); G.L. c. 43B, § 12; see also Mass. Const. Amend. Art. 2, § 9, as amended by Mass. Const. Amend. Art. 89, § 9 (existing special laws remain in effect, unless amended or repealed, and have the force of town charters).

On August 30, 2002, Ashland filed an Answer to Framingham's petition. On November 25, 2002, the parties filed a Joint Pre-Hearing Memorandum, stipulating facts not in dispute and setting forth arguments regarding the scope of review in this proceeding. On February 28, 2003, the Department issued an interlocutory scope order ("Scope Order"), holding that sewerage charges for previous five-year periods, including the period beginning December 9, 1998 through December 8, 2003, are not reviewable, and limiting the scope of this proceeding to a "review of the fair proportionate share of the cost of maintaining Framingham's sewerage system to be paid by Ashland for the use of Framingham's facilities after December 9, 2003 under the 1963 Intermunicipal Agreement." Scope Order at 13-15.

The Department conducted evidentiary hearings over four days: June 18, 2003; July 16, 2003; August 20, 2003; and September 23, 2003. Framingham sponsored the testimony of Robert Addelson, chief financial officer for Framingham; Stephen H. Geribo, senior vice-president and principal engineer for SEA Consultants, Inc., a civil engineering consulting firm; and Peter A. Sellers, director of public works for Framingham. Framingham provided two additional witnesses upon the Department's request: John Bertorelli, town engineer for Framingham; and Robert Angelo, water and sewer superintendent for Framingham. Ashland sponsored the testimony of Dexter Blois, former town manager for Ashland; Steven Sylven, senior project manager and head of the environmental department for Vollmer Associates, LLP, a civil engineering consulting firm; and John T. Hannigan, senior associate and civil engineer for Vollmer Associates, LLP. Ashland provided one additional witness to respond to the Department's cross-examination: Joseph Celano, former

superintendent of the department of water and sewers for Ashland. The evidentiary record includes 226 exhibits and nine responses to record requests. Framingham and Ashland filed initial briefs on October 24, 2003.[2] Ashland filed a reply brief on October 31, 2003. Framingham filed a reply brief on November 7, 2003.

B. Summary of the IMA

The IMA permits Ashland to discharge its sewage into Framingham's sewerage system at two points, the Farm Pond Interceptor and the Bates Road sewer junction, both of which are located in Framingham (Exh. FR-14, at §§ 1-2). The combined sewage flows through Framingham's system to a connection with the MWRA's facilities near Arthur Street in Framingham (Exh. FR-2, at 2-2).

Ashland discharges sewage from the Chestnut Street pump station in Ashland through a pipeline that it owns and maintains, much of which is located in Framingham, to a point along the Farm Pond Interceptor in Framingham. The IMA permits Ashland to discharge sewage at the Farm Pond Interceptor at a maximum rate of 2.0 million gallons per day ("MGD"), with a momentary discharge rate not to exceed 2.5 MGD (1,760 gallons per minute) for five minutes (Exh. FR-14, at § 1). Under the current terms of the IMA, the annual charge to Ashland for discharging sewage at the Farm Pond Interceptor is $3,000 for use up to 1.0 million gallons of

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[2] On November 6, 2003, the Department granted Framingham's motion to strike new documents attached to Ashland's initial brief and portions of Ashland's brief referring to those documents, because the documents were not entered into evidence before the record was closed.

average daily flow, and an additional $2,000 for average daily flow exceeding the first 1.0 million gallons, up to 2.0 million gallons (id.).

Ashland discharges sewage from the Brackett Road pump station in Ashland, through a pipeline that it owns and maintains in Framingham, to a connection at Bates Road in Framingham. The IMA permits Ashland to discharge sewage at the Bates Road connection at a maximum rate of 200 gallons per minute (id., at § 2). The IMA does not specify a separate maximum daily discharge rate for this connection. Under the current terms of the IMA, the annual charge to Ashland for discharging sewage at the Bates Road connection is $2,500 (id.).

The IMA states that after 30 years, Ashland will have made full payment for its proportionate share of capital costs of Framingham's sewerage system (id., § 3). The IMA states that thereafter all payments made to Framingham shall be for Ashland's proportionate share of the cost of maintaining Framingham's sewerage system (id.).

C. Scope of this Order

In determining Ashland's "fair proportionate share of the cost of maintaining Framingham's sewerage system" in this Order, we consider two categories of expenditures under the Special Act.[3] The Special Act contemplates that Ashland would pay both "annual

[3] We incorporate into this Order the determinations in our interlocutory Scope Order. Therefore, the rates determined in this Order apply to the rates to be paid by Ashland to Framingham for use of Framingham's facilities beginning on December 9, 2003.

charges for the transportation . . . of sewage"[4] and "a proportion of the cost of construction of additional works required." Special Act, § 1. In this Order, we first consider the appropriate formula for calculating Ashland's share of Framingham's annual operations and maintenance ("O&M") costs. Next, we consider the appropriate method for allocating the capital costs of improving or replacing sewerage facilities. Finally, we make findings regarding a dispute between the parties about whether the IMA requires Ashland to install meters at the interconnection points of the towns' sewerage systems.

We note that the Towns were free to agree to any and all terms of service and attendant obligations within the scope of the Special Act. The only role or jurisdiction for the Department under the Special Act is to determine "the proper and just sum" to be paid by Ashland for service agreed to with Framingham, in the event that the Towns could not mutually agree on "the proper and just sum" and either town petitioned for Department determination. In other words, the Special Act's role for the Department concerns the bill for services, not the scope of services. Having said that, we note that construction of some of the IMA's terms is disputed, and we must therefore construe the IMA to make a determination of payment obligations.

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[4] We note that the Special Act also refers to "treatment" of sewage, but we understand this to refer only to the treatment to the sewage necessary for the operations and maintenance of Framingham's sewerage system, not to the treatment performed by the MWRA at the Deer Island treatment plant (see Tr. 1, at 95).

II. OPERATIONS AND MAINTENANCE FORMULA

A. Proposed Formulas

The IMA requires Ashland to pay Framingham "a fair and equitable proportionate share of the actual cost of the maintenance of the system" (Exh. FR-14, at § 3). The IMA does not specify a particular formula to be used in calculating annual charges. Both parties have proposed formulas to be applied on a prospective basis to calculate Ashland's annual payment to Framingham for the use of Framingham's sewerage system.

Framingham argues that the appropriate formula for calculating Ashland's annual share of O&M costs would consist of two components (Framingham Initial Brief at 3, citing Exhs. FR-37, at 16-17; FR-2, at 6-21). The first component is the ratio of Ashland's flow to the sum of Framingham's and Ashland's flows through Framingham's entire sewerage system ("Flow Ratio") (Exh. FR-37, at 16-17). The second component is Framingham's sewer-related O&M costs for Framingham's entire sewerage system ("Framingham O&M") (id.). Framingham's proposed formula is as follows:

Ashland's Cost = Flow Ratio **x** Framingham O&M

Framingham clarifies that the proposed Framingham O&M component consists of Framingham's total sewer budget, less capital expenditures, debt service fees, and MWRA fees, but inclusive of indirect costs, such insurance and benefits (Exh. DTE-F-1-18, Tab G; see also Exh. DTE-FR-3-12).

Ashland proposes two alternative formulas. Ashland initially proposed a formula to calculate the amount that it should pay Framingham for O&M based on three components:

(1) the ratio of the share of the inch-miles of sewerage pipeline in the Framingham system that Ashland claims to use, to the total inch-miles in the system ("Inch-Mile Share"); (2) the ratio of Ashland's interbasin transfer allocation ("IBTA")[5] to the sum of Ashland's and Framingham's IBTAs ("IBTA Ratio"); and (3) Framingham's O&M costs ("Framingham O&M") (Exh. ASH-12, at 26). Inch-miles are calculated by multiplying the diameter of a pipe segment in inches by its length in miles. Ashland's formula is as follows:

Ashland's Cost = Inch-Mile Share **x** IBTA Ratio **x** Framingham O&M

(id.).

Ashland also proposes the following alternative formula, based on estimated flow through the portion of Framingham that is "tributary" to the shared pipes:

$$\text{Ash. Cost} = \frac{\text{Ash. Flow}}{\text{Ash. Flow} + (0.60)\ \text{Fra. Flow}} \times \frac{\text{Ashland Inch-Miles}}{\text{Tributary Area Inch-Miles}} \times (0.60)\ \text{Framingham O\&M}$$

(Ashland Initial Brief at 20).

B. Positions of the Parties

1. Framingham

Framingham argues that the language of the IMA clearly states that Ashland's annual payments are to be based on Framingham's O&M costs for its entire system, rather than based only on its O&M costs for two pipes (the Farm Pond and Bates Road interceptors) within that system (Framingham Initial Brief at 7). Framingham claims that when the parties entered into

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[5] The IBTA is the maximum amount of water, including wastewater, that the Massachusetts Water Resources Commission permits a municipality to transfer out of a river basin, absent further approvals, pursuant to G.L. c. 21, §§ 8B-8D.

the IMA in 1963, neither party could have intended that Ashland pay only a share of the O&M costs related to specific pipe segments within the Framingham system, because both parties knew that no such disaggregated data were available (id. at 8). Framingham contends that its formula is consistent with this interpretation of the IMA in that it incorporates O&M costs for its entire system (id.). Further, Framingham contends that because the existing IMA explicitly links Ashland's payments to the amount of its flow, the new O&M formula should also tie Ashland's payment to the actual amount of its flow (id.). Conversely, Framingham argues that the language of the IMA does not support either of the formulas proposed by Ashland, which involve calculating the inch-miles of pipe used and relying upon estimates or assumptions about flow (id. at 9). For these reasons, Framingham argues that the Department should apply Framingham's flow-based formula in determining the annual payment to be made by Ashland for its use of Framingham's system (id. at 10).

In addition to being consistent with the language and intent of the IMA, Framingham argues, its formula is consistent with Department precedent and the Department's general rate-setting goals (id.). Specifically, Framingham cites to Boston Gas Company, D.P.U. 18661, at 9 (1977), wherein the Department determined that a customer of Boston Gas Company should pay its proportionate share of the costs of Boston Gas' system (id. at 12). Framingham notes that the Department held that where direct cost assignment is inappropriate because of administrative or practical concerns, use of system-wide cost allocators is appropriate, even if the use of those system-wide allocators results in a particular customer bearing more or less than its actual costs of being served by the system (id. at 13-14, citing

Boston Gas Company, D.P.U. 90-17/18/55, at 29 (1990)). Framingham argues that the fact pattern presented in the instant proceeding is similar to the previous cases, and therefore, system-wide cost allocators are appropriate (id. at 15).

Framingham argues that its formula is consistent with the Department's rate-setting goals of efficiency, simplicity, continuity, fairness, and earnings stability (id. at 17, citing D.P.U. 90-17/18/55, at 12). Framingham argues that basing Ashland's payments on a flow-based share of Framingham's total O&M costs would be fair to other users of Framingham's system, because those users are billed in a similar fashion (id. at 18). Framingham contends that applying its formula would be consistent with the Department's goals of efficiency and simplicity, because the formula is easy to apply and is based on metered flow data and Framingham's O&M budget data (id. at 22-23).

In response to Ashland's suggestion that recoverable O&M expenses could be restricted to those associated with the shared facilities, Framingham explains that it does not track O&M cost data for particular pipes or geographic subsets of its system (Tr. 1, at 161, 187, 191-92; Tr. 2, at 300). Therefore, Framingham states, it is not currently practical to differentiate between the O&M expenses for the shared facilities versus O&M expenses for the rest of its system (Tr. 2, at 300). Furthermore, Framingham explains that there are fixed costs associated with maintaining work crews and equipment for performing O&M tasks, and that the O&M costs associated with the shared pipes enjoy economies of scale by virtue of being part of the larger town system (Tr. 1, at 196). Framingham argues that a formula based on O&M costs only for the shared facilities would require complicated and costly measures to

segregate and apportion these expenditures (Tr. 1, at 189, 193-94, 197; Tr. 2, at 304-10; Framingham Initial Brief at 23) and might invite disputes regarding the proper allocation of costs to the shared versus non-shared portions of the system (Tr. 1, at 192-93; Framingham Initial Brief at 24).

Framingham also argues that its formula is consistent with the way that other municipalities, including Ashland, charge sewer customers (Framingham Initial Brief at 24-26, citing Exhs. FR-5; FR-6; FR-7; FR-8; FR-9). Framingham notes that the MWRA also calculates its O&M assessments to member communities based on flow, not based on the inch-miles of pipe used between a municipality's connection point and the terminus of the MWRA's system at the Deer Island treatment plant (id. at 25-26, citing Exh. FR-37, at 25; Tr. 3, at 466).

Framingham argues that the Department should reject the formula that Ashland proposed at the outset of this proceeding for the following reasons: (1) it is unsupported by reliable expert testimony; (2) it is inconsistent with the language of the IMA; and (3) it is based on unverified data and invalid assumptions (Framingham Initial Brief at 35). Framingham contends that two of Ashland's witnesses are not qualified to testify as to the proper method of allocating O&M costs related to a sewer system, because neither has had prior experience in this regard (id. at 36, citing Tr. 3, at 546, 648-49). Further, Framingham points out that the witness sponsoring Ashland's cost allocation formula acknowledged that he adopted the formula without performing any independent research to derive an appropriate cost allocation method (id., citing Tr. 3, at 547-48, 557).

Framingham claims that Ashland's formula is inconsistent with the language of the IMA, because it applies terms based on IBTA limits and inch-miles of pipe used to transport Ashland's sewage in the calculation (id. at 38). Framingham argues that since the IMA does not mention either of these terms, Ashland's formulas are inconsistent with the IMA (id., citing Exh. FR-14).

Framingham contends that it is inappropriate to apply IBTA limits to allocate costs, because they are based on hypothetical peak flows, rather than actual flows (id. at 40). Framingham argues that Ashland concedes that it proposed using the IBTA factor because no actual flow data were available, but that actual flow data are preferable to estimated or assumed flows (id. at 41, citing Tr. 3, at 587, 592). Framingham states that the MWRA does maintain actual flow data (id., citing Exh. FR-2).

Regarding the use of inch-miles of pipe as a factor in the O&M formula, Framingham argues that the term is inappropriate, because there is no nexus between Framingham's O&M costs and the inch-miles of pipe used by Ashland (id. at 42). In addition, Framingham argues that the way that Ashland incorporates the inch-mile factor into the formula assumes incorrectly that every inch-mile of pipe will cost the same amount to maintain (id. at 42-43). Framingham also disputes the accuracy of the inch-mile values used by Ashland (id. at 43-44). For these reasons, Framingham urges the Department not to adopt the formula proposed by Ashland at the outset of this proceeding (id. at 47).

During the course of the proceedings, Ashland proposed an alternative approach to apportioning O&M costs by estimating the flow from the parts of Framingham that are

tributary to the shared facilities (see Tr. 3, at 523-25). Framingham challenges the assumptions underlying Ashland's proposed estimation method, and moreover, Framingham argues that there is no justification for allocating costs based on estimates or assumptions, rather than available data (Framingham Initial Brief at 48-50). Framingham also urges the Department to reject Ashland's alternative formula, because it still includes inch-miles as a factor (id. at 51).

2. Ashland

Ashland states that it proposed the IBTA ratio because it is the best alternative to measuring the actual flow of the towns through the shared facilities (Ashland Initial Brief at 7). Ashland argues that using the IBTA ratio is a "perfectly reasonable way of addressing the flow of each of the towns through the shared pipes," and that actual metering of flow is equally useful (id. at 8). Ashland agrees that determining Framingham's flow in the shared facilities by metering could be prohibitively expensive (id. at 9-10).

As an alternative to using the IBTA ratio as a proxy for Ashland's share of the flow in the shared facilities, Ashland agrees with Framingham that one appropriately-placed meter could enable the parties to determine how much of Framingham's flow is tributary to the shared pipes, and that this figure could be used to calculate the ratio of Ashland's flow to total flow in the shared pipes (id. at 10, 20).[6] Ashland also claims that approximately 60 percent of

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[6] Ashland agrees with Framingham that a meter could be installed near the Arthur Street pump station to measure flow from the part of Framingham that is not tributary to the shared facilities (see Tr. 4, at 868; Ashland Initial Brief at 10). Ashland states that this meter would be installed upstream of the point where the Speen Street/Saxonville flow enters the MWRA's facilities (Ashland Initial Brief at 10).

Framingham's flow is tributary to the shared-pipes (id. at 10-11, citing Tr. 2, at 209-10). Consequently, Ashland proposes to substitute a flow ratio for the IBTA ratio in the O&M formula as follows:

Flow Ratio = Ashland Flow / (Ashland Flow + (0.60) Framingham Flow)

(id.). Correspondingly, Ashland argues that Framingham's total O&M cost used in the formula should be multiplied by this same factor (i.e., 60 percent), so that it represents only the O&M cost associated with the facilities in the tributary area (id. at 20).

Ashland contends that the inch-mile component should be retained in the O&M formula, because excluding it would assume incorrectly that Ashland's sewage flows throughout Framingham's entire system (id. at 11). However, if the flow ratio is modified to reflect only flows through the parts of Framingham that are tributary to the shared system, Ashland would adjust the denominator of the inch-mile component to reflect the inch-miles only for those pipes in the tributary area, rather than for the entire Framingham system (id. at 11).

In addition, Ashland urges the Department to reject Framingham's testimony as to the total number of inch-miles in Framingham's system (id. at 19, citing Tr. 4, at 801-03). Ashland contends that Framingham has provided no support for its claim that the number of inch-miles that Ashland claims to be the total inch-miles in Framingham's system, 2,827 inch-miles, should be adjusted (id.).

Ashland contends that because the IMA refers to "certain trunk lines," notwithstanding references to the "system," and because the IMA only permits connection to Framingham's

system at two points rather that at any point in Framingham's system, the formula adopted by the Department should take into account that Ashland only uses a limited part of Framingham's system (Ashland Reply Brief at 1-4). Ashland also maintains that the language of the IMA does not clearly indicate the parties' intent when the original rates were set (id. at 4). Moreover, Ashland argues that the intent of the parties in the IMA is immaterial to this proceeding, because the Department's task is to set a fair solution going forward (id. at 5).

Ashland argues that the Department's precedent as cited by Framingham, specifically D.P.U. 18661, is not applicable to the instant proceeding, because Ashland is not dependent upon the portion of the Framingham system that is outside of the shared facilities to transport its wastewater (id. at 7). Therefore, Ashland claims that it receives no benefit from these facilities, in contrast with the Department's finding in D.P.U. 18661 (id.).

Ashland also argues that D.P.U. 90-17/18/55 is not analogous to this proceeding (id. at 9-11). Ashland states that, in D.P.U. 90-17/18/55, the issue was the nature of the pipes used by the petitioning party, while in this proceeding the issue is the amount of pipe that Ashland uses (id. at 10). Ashland states that in D.P.U. 90-17/18/55, the Department found that the pressure level of transmission and distribution ("T&D") plant is not necessarily a "class-specific, cost-causative" factor in Boston Gas' system, and that, therefore, a cost allocation of T&D plant based on pressure was not appropriate (id. at 11, citing D.P.U. 90-17/18/55, at 30). Ashland argues that in the instant proceeding, however, the amount of pipeline used by Ashland is a direct cost-causative factor (id.). Ashland contends

that the O&M costs related to the shared facilities are markedly less in comparison to the O&M costs for the rest of the Framingham system (id.).

Ashland argues that Framingham's formula is not fair and equitable, because it does not take into consideration that Ashland uses only a limited share of the Framingham system (id. at 5). Ashland claims that its proposed formula is "as simple to use as possible" in order to achieve a fair and equitable result (id. at 26). Ashland argues that excluding an inch-mile component from the O&M formula would unfairly burden Ashland with excessive costs (id.).

C. Analysis and Findings

1. Introduction

The Department's objective in this proceeding is to determine the proper and just sum which shall be paid by Ashland to Framingham. In order to meet this objective, the Department must determine Ashland's "fair and equitable proportionate share" of the cost of maintaining Framingham's sewerage system for Ashland's joint use of the system. Special Act, § 1; see also Scope Order at 13-15. The Department is guided[7] by its long-standing rate setting goals of efficiency, simplicity, continuity, fairness, and earnings stability. Boston Gas Company, D.T.E. 03-40, at 365 (2003); Fitchburg Gas and Electric Light Company,

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[7] Because the Special Act governs a permissive relationship between municipalities, and does not directly relate to the rights and duties that arise between a monopoly utility provider and its customers, the dispute stands on a different footing from ordinary utility regulation. Accordingly, precedent from this latter sphere is suggestive rather than determinative. The Department's role under the Special Act is more akin to an arbitrator's than a regulator's. Even so, the principles drawn from regulation under Chapters 159, 164, and 165 are useful. Employing these principles, mutatis mutandis, is consistent with the Legislature's delegation of cost determination to the Department under the terms of the Special Act.

D.T.E. 02-24/25, at 252 (2002). Efficiency means that the rate structure should allow a company to recover the cost of providing the service and should provide an accurate basis for consumers' decisions about how best to fulfill their needs. The Department has determined that a rate structure achieves the goal of simplicity if it is easily understood by consumers. Rate continuity means that changes to rate structure should be gradual to allow consumers to adjust their consumption patterns in response to a change in structure. Fairness means that no class of consumers should pay more than the costs of serving that class. Earnings stability means that the amount that a company earns from its rates should not vary significantly over a period of one or two years.[8] D.T.E. 02-24/25, at 252-53.

2. Shared Facilities versus the Entire System

Before reviewing the specifics of the two towns' proposals, we address the preliminary question of whether Ashland's annual O&M charge should be assessed on the basis of a share of costs of "shared facilities" or on a share of costs to maintain Framingham's entire system. In D.P.U. 18661, at 9, the Department found that Hanscom Air Force Base ("Hanscom") derived benefits from the entire Boston Gas distribution system. Consequently, the Department found that Hanscom should pay its proportionate share of the costs to maintain that system. Id. In the instant proceeding, Ashland argues that it does not derive a benefit from the portion of the Framingham system that is outside of the shared facilities. Ashland points to several instances in which Framingham stated that certain segments of the Framingham system

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[8] The earnings stability goal does not apply to the instant proceeding, because the "proper and just sum" provision under the Special Act contemplates that Framingham would provide transport at cost. Special Act, § 1.

could be removed without a detrimental effect to the flow of Ashland's sewage through the shared facilities (Ashland Reply Brief at 7, citing Tr. 1, at 101-03). Nevertheless, Framingham maintained that the system must be considered as a whole (Tr. 1, at 101-03).

The Department finds that it is appropriate to consider the costs of Framingham's entire system rather than to account for costs of specific pipes through which Ashland's sewage may flow. The record indicates that the physical extent of Framingham's system needed to accommodate Ashland's sewage varies, depending on the volume of flow and hydraulic conditions within Framingham's sewerage system at any given time (Exhs. ASH-FR-1-14; DTE-F-1-31; Tr. 1, at 79, 141-43, 146-47; Tr. 2, at 263-64; Tr. 4, at 799-800). More than a discrete subset of Framingham's system is used to provide service to Ashland. Cf. D.P.U. 18661. Moreover, determining the O&M costs for the shared facilities would be unworkable, because O&M cost data are not available for specific elements within the Framingham system (Tr. 1, at 161, 187-88, 191-92; Tr. 2, at 300). For these reasons, the Department must consider the Framingham system as a whole when determining Ashland's fair and equitable share of O&M costs. Therefore, Ashland will be required to pay its fair share based on a proportion of the O&M costs for the entire Framingham system.

3. Framingham's Proposal

Framingham's proposed O&M formula is as follows:

$$\text{Ashland's Cost} = \frac{\text{Ashland Flow}}{\text{Ashland Flow} + \text{Framingham Flow}} \times \text{Framingham O\&M}$$

This proposed formula meets the Department's goal of efficiency, because it is based on readily available information and provides Ashland with an appropriate price signal about the

cost of the service that Framingham provides. Framingham's formula meets the Department's goal of simplicity, as its clearly defined terms make it easy to understand. Framingham's proposed formula also achieves the Department's goal of fairness, as Ashland will be paying its proportionate equitable share of Framingham's sewer-related O&M costs.

Ashland had 3,562 sewer customers as of July 30, 2002 (Exh. SIS-A-1-4 (a)). The average customer with a four-bedroom house paid $1,045 for sewer services in 2002 (Exh. SIS-A-1-4 (c)). Using Framingham's formula (based on 2002 fiscal year data), Ashland would pay approximately $278,000 per year, which would represent an increase of $272,500 over what Ashland currently pays Framingham (see Tr. 2, at 364; Framingham Initial Brief at 33 n.7). If Ashland allocates this increased expense among all of its customers, it would yield an average rate increase of approximately $77 per customer, for a total average sewer bill of $1,122 per year per customer.[9] This increase represents an increase of 7.4 percent over what Ashland's sewer customers paid for sewer services in 2002. Therefore, Framingham's formula satisfies the Department's goal of rate continuity.

4. Ashland's Proposals

At its core, Ashland's tributary flow formula is similar to Framingham's proposal in that it calls for O&M costs to be allocated in proportion to a ratio of Ashland's flow to total

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[9] It would be up to Ashland to determine how to allocate this cost among its own customers. The Department recognizes that the remedy in this proceeding significantly increases the amount that Ashland pays Framingham. However, given that Ashland's annual payment of $5,500 per year, unchanged since 1963, amounts to $1.54 per customer (based on 3,542 current sewer customers), it is not surprising that the cost of service is higher.

flow (see Ashland Initial Brief at 20).[10] However, Ashland's proposed formula calls for an additional discount of its share in proportion to the ratio of the inch-miles of "shared" pipeline to the total inch-miles of the system. Ashland also proposes to estimate the flow through the tributary area based on 40 percent of total flows not passing through the shared facilities (id. at 11).

Ashland misconstrues Framingham's acknowledgment that approximately 40 percent of total system flow reaches the MWRA's facilities without passing through the shared facilities, while 60 percent of the town's system is tributary to the shared facilities (cf. Tr. 2, at 209-10). Ashland's formula assumes that these estimates do not include Ashland's flow through the system (Ashland Initial Brief at 11, 20).[11] Upon review of Framingham's testimony and the MWRA's flow data, it is evident that the total system flow to which Framingham refers includes Ashland's flow through the system (compare Tr. 2, at 358-62 with Exh. DTE-RR-6).

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[10] Ashland's proposed IBTA ratio was a proxy for the ratio of Ashland's flow to total flow (Ashland Initial Brief at 7). Using the IBTA figures to represent flow would be inappropriate. These values are merely regulatory limits on flow. The record shows that the values have little relation to the actual flow from a town (Tr. 3, at 584). Moreover, if Ashland were discharging at a rate equivalent to its IBTA limit on a regular basis, it would be in clear violation of the IMA, as Ashland's IBTA is nearly 1.0 MGD greater than Ashland is allowed to discharge under the IMA (Exhs. FR-14, at §§ 1- 2; ASH-12, at 26). It could be argued that it may be appropriate to use IBTA values in the absence of actual flow data; however, the MWRA does meter Ashland's and Framingham's actual flow (Exh. ASH-FR-1-16; RR-DTE-6). Therefore, because actual flow data exist, it is unnecessary to incorporate an element of inaccuracy into the O&M formula through the use of the IBTA ratio.

[11] Ashland adjusts only Framingham's flow in the denominator of its flow ratio term: (Ashland flow + (0.60 x Framingham flow)).

Therefore, Ashland's revised flow ratio would understate Ashland's share of the flow through the tributary area.[12]

While this flow ratio error could be corrected, a reduction in total flows to include only the areas tributary to the shared facilities should also be accompanied by a corresponding reduction in total O&M costs to account for the costs for the tributary area only. The record is clear that Framingham does not track O&M expenses by geographic area (Tr. 1, at 161, 187-88, 191-92; Tr. 2, at 300); thus, the corresponding reduction to total O&M costs to reflect the cost of the tributary area alone cannot be determined. In the absence of specific cost data for the tributary area, both Framingham and Ashland propose that Framingham's total O&M cost can simply be multiplied by 60 percent to reflect the cost of O&M for the tributary area (Ashland Initial Brief at 20; Framingham Initial Brief at 33). However, the mathematical effect of adjusting both total flow and total O&M by the same factor is for these adjustments to cancel each other out.[13]

Thus, adjusting the O&M formula in this manner to account for the fact that not all of Framingham's flow is tributary to the shared facilities would not change that resulting rate paid to Framingham by Ashland. Therefore, the Department will not incorporate an adjustment to

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[12] The sum of the combined flows should be multiplied by 60 percent: 0.60 x (Ashland flow + Framingham flow) to reflect Framingham's estimate that 40 percent of total flows do not pass through the shared facilities.

[13] We note that the discrepancy between Framingham's calculation of Ashland's share of O&M costs for the entire system ($278,000) versus Framingham's calculation of Ashland's share of 60 percent of the system ($280,000) appears to be due to rounding (see Framingham Initial Brief at 33).

the O&M formula to account for the amount of Framingham's flow that is tributary only to the shared facilities.

Regarding Ashland's proposed inch-mile ratio, Ashland has not demonstrated the reliability of the data used to calculate the inch-mile component. In fact, Ashland admits that it did not verify the inch-mile values in its calculation (Tr. 3, at 567-68).[14] In addition, Ashland's formula proposes to multiply the denominator of the inch-mile component by 60 percent to represent the pipes in the tributary area. However, there is no evidence in the record demonstrating the actual number of inch-miles that comprise either the portion of the Framingham system that is tributary to the shared facilities or the area that is not tributary to the shared facilities.

Even if reliable inch-mile data were available, including an inch-mile ratio factor, in addition to a flow ratio, would be inappropriate. This is because, as the Department found above, use of the flow ratio alone results in a fair allocation of costs; any reduction in Ashland's share (e.g., through the use of the inch-mile ratio), would result in Ashland paying less than its fair share. Furthermore, discounting the amount that Ashland pays would send an improper price signal to Ashland regarding the true cost of the service that Framingham provides, and therefore, would be inefficient. Therefore, the Department finds that Ashland's

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[14] We note that, based on a recent mapping of its own system, which suggests that the total inch-miles may be significantly lower than the value relied upon by Ashland in its calculation, Framingham also disputes the validity of the inch-mile numbers used by Ashland, but because Framingham was unable to demonstrate its new estimate to a reasonable degree of certainty, we also do not rely on Framingham's new assertion in evaluating the reliability of Ashland's estimate (Tr. 4, at 801-03).

proposal does not meet the Department's rate setting goals. For the reasons stated above, the Department will not apply an inch-mile factor to the O&M formula.

5. Final O&M Formula and Data Sources

Based on the foregoing, the Department finds that the following equation fairly calculates Ashland's O&M cost on an annual basis:

$$\text{Ashland's Cost} = \frac{\text{Ashland Flow}}{\text{Ashland Flow} + \text{Framingham Flow}} \times \text{Total Framingham O\&M}$$

Flow data for both Ashland and Framingham are currently available from the MWRA. However, as further discussed in Section IV below, Ashland's flow is currently metered at the Chestnut Street and Brackett Road pump stations in Ashland, not at the discharge points in Framingham per the IMA. Until new meters are installed at the discharge points, the parties shall use MWRA data to calculate the flow ratio. When new meters at the discharge points are functional, the parties shall use data from these meters to determine Ashland's flow. Use of the best data now or later available is integral to determining "the proper and just sum" due now or in future years under the Special Act.

The Department finds that Framingham's O&M component consists of Framingham's total sewer budget less capital expenditures, debt service fees, and MWRA fees, but inclusive of indirect costs. The parties are to recalculate annually according to this rate method the cost to provide service to Ashland by using budget data from the most current year for which

Framingham's O&M budget has been certified by Framingham's auditors and flow data from the corresponding period.[15]

III. CAPITAL COSTS

A. Introduction

According to Framingham, when the IMA was executed in 1963, the pipes comprising approximately half the length of the shared facilities were about 50 years old and nearing the end of their useful life (Tr. 1, at 170). Since then, Framingham states, it has replaced much of this pipeline (id.; Exh. FR-ASH-1-2). Framingham estimates that the shared pipelines have lasted on average 35 to 40 years (Tr. 1, at 170). Framingham further estimates that about half of these pipes are now approximately 35 years old and half are about 15 years old (id. at 170-71).

Under the IMA, the parties agreed that for the first 30 years, Ashland's annual payments to Framingham would be deemed to include payment for a proportionate share of Framingham's capital investment in its sewerage system, in addition to "a fair and equitable proportionate share" of the cost of maintenance of the system; after 30 years, Ashland would be deemed to have made full payment for its share of investment costs, and further payments would be for maintenance only (Exh. FR-14, at § 3). Both parties agree that Ashland should be responsible for a share of the future capital expenses associated with its use of the

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[15] Although Framingham provided the Department with budget data for Fiscal Year ("FY") 2003, these figures had not yet been certified (DTE-RR-5). Therefore, unless certified FY 2003 data are now available, the parties are to use Framingham's O&M budget data from FY 2002 and to calculate Ashland's share for use of Framingham's system for the year.

Framingham sewerage system (Exhs. FR-37, at 31; DTE-F-1-9; DTE-F-1-13; Tr. 1, at 172; Tr. 2, at 263; Tr. 4, at 596; Ashland Reply Brief at 24). However, the parties disagree as to how to calculate Ashland's share of future capital expenses. Consequently, to determine Ashland's share of future capital costs, the Department must review (1) which facilities Framingham may recover a share of capital investment costs for; (2) which costs associated with these facilities are eligible for recovery; and (3) how Ashland's share of the recoverable costs should be determined.

B. Eligible Facilities

1. Positions of the Parties

a. Framingham

The parties agree that Ashland's sewage flows through certain of Framingham's pipes, but disagree whether it also may occupy other pipes, and if it does, whether Ashland should be responsible for a share of capital expenditures associated with those additional facilities. Framingham proposes to bill Ashland for capital projects that it undertakes only on those facilities used by both Ashland and Framingham (Tr. 1, at 172). Unlike its position with regard to O&M, in which Framingham's town-wide sewerage O&M expenses serve as the starting point for calculating Ashland's share, Framingham states that capital costs can be tied to specific facilities (Exh. FR-2, at 6-22). Framingham asserts that the universe of facilities for which Ashland should pay a share of capital expenses includes both the "dry-weather

shared system,"[16] as well as pipes that are used only during overflow conditions (Tr. 2, at 263-64, 294-95).

Framingham asserts that the "shared segments" of its sewerage system include, among others, both the original path taken by sewage from the Farm Pond connection, as well as the main path such sewage currently takes (Exh. ASH-FR-1-2; FR-16; FR-43; Tr. 1, at 142-45; Tr. 4, at 796-98).[17] Framingham's list of pipes that it asserts represents pipelines that "transport Ashland's flow during dry-weather conditions" includes the same pipes as the "shared segments," except for part of the original path of Ashland's sewage from the Farm Pond discharge.[18]

Framingham contends that Ashland sewage can occupy parts of the Framingham system beyond the "dry-weather shared pipes," typically during periods of high flow

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16 The "low-flow" or "dry-weather" shared pipe system is that portion of Framingham's sanitary sewerage system which conveys Ashland's sewage at times of little rainfall and normal or low groundwater levels. This subset of the system is distinguished from a potentially larger subset of the system that carries Ashland's sewage during high-flow conditions, which may coincide with wet weather or other factors, such as backups caused by blockages within or downstream of the shared facilities.

17 Framingham explains that part of the original route (from the intersection of Bishop and Waverly Streets, along Waverly Street to Second Street and then to the Arthur Street pump station area) now serves as an alternative to the path that connects the Farm Pond interceptor to the Beaver Dam interceptor (Exhs. ASH-FR-1-2; FR-16; FR-43; Tr. 1, at 142-45; Tr. 4, at 796-98).

18 Specifically, the list of pipes in Exh. ASH-FR-1-2 ("shared facilities") includes a 24"x36" brick sewer that was part of the original path of Ashland's sewage from the Farm Pond connection, and now serves as an alternative path; the listing in DTE-RR-8 ("dry-weather transport") does not include this sewer (Exh. ASH-FR-1-2, DTE-RR-8; Tr. 1, at 142-45, 149-50, 153).

(Exh. DTE-F-1-31; Tr. 1, at 143-46; Tr. 2, at 262-63; Tr. 4 at 798-800). According to Framingham, when sewage "flows [exceed] the capacity of downstream sewers in the MWRA system, flows from Ashland (along with flows from Framingham) are temporarily stored in an overflow pipe located near the discharge to the MWRA's system, and possibly in other pipes within the Framingham system" (Exh. DTE-F-1-31). Depending on the volume of flow in the system, Framingham explained that at several points along the paths described above, sewage can also flow into parallel or lateral pipes (Exh. ASH-1-14; Tr. 1, at 79, 141-43, 146-47).[19]

Framingham asserts that the "dry-weather" pipes are not sufficient in all circumstances and that Ashland benefits from the presence of overflow, parallel, and certain lateral pipes; therefore, Ashland should share in the cost of capital projects undertaken to repair or replace these additional pipes (Tr. at 2, at 295; Tr. 4, at 819). Framingham acknowledges that some of these pipes do not transport Ashland's sewage on a daily basis, but explains that their availability must be supported at all times (Tr. 4, at 823-24).

Framingham states that, based on field investigations that it has performed, it is familiar with the connectivity of pipes to the dry-weather shared pipes, and asserts that some of Ashland's flow does go into overflow pipes (Tr. 2, at 263-64). However, Framingham states that additional metering would be required to refine its list of potentially used pipes to a more definitive list, and to establish the frequency and extent of use of any of these additional

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[19] For example, Framingham notes that several pipes run parallel the Beaver Dam Interceptor from the intersection of Eames and Herbert Streets to Morton and Waverly Streets (DTE-RR-8; Tr. 1, at 145-46), and are cross-connected to them (Tr. 1, at 146, Tr. 4, at 787-90, 795).

overflow pipes (id. at 264-66, 268-69, 294). Framingham recommends either continuous metering, or collection of more limited data in conjunction with the development and application of a computerized model to predict what might occur under various meteorological conditions (id. at 252, 264-65). Framingham estimates that the cost of the metering and computer modeling would be "a few hundred thousand dollars" (id. at 253). Framingham states that no additional metering would be necessary to apportion the costs of capital improvements on the dry-weather shared system (id. at 294).

In response to Ashland's contention that none of the increased flows in the system that lead to "surcharging"[20] or to the use of lateral lines are the result of increased flows from Ashland, Framingham offers evidence that Ashland has at times exceeded the IMA's maximum discharge rates (Exhs. FR-19; FR-45; FR-46; Tr. 4, at 808, 810-12),[21] and that periods of surcharging within the Framingham system have coincided with these excessive discharge rates (Tr. 4, at 809-12). Framingham argues that discharges from Ashland that are in excess of the IMA limits increase the risk to Framingham of a surcharge (Framingham Reply Brief at 19).

b. Ashland

Ashland proposes to allocate capital costs in proportion to the share of the capacity of the interceptor sewers that it uses (Tr. 3, at 519). Ashland draws support for limiting the

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[20] A "surcharge" occurs when flow into a pipe exceeds the capacity of the pipe.

[21] Framingham contends that Ashland "exceeded the maximum permissible discharge rate of 2.5 MGD on several occasions" (Exh. FR-41), but does not indicate whether such instances persisted longer than five minutes. The Department cannot discern from the graph offered in Exh. FR-19 the duration of the excess discharges.

universe of eligible facilities from the IMA's reference to "certain sewer trunk lines" in its description of the facilities in Framingham that Ashland uses (id. at 630-31). Ashland states that the parts of the Framingham system that it uses are "from Arthur Street to Beaver Street, Beaver Street to Waverley Street, Waverley Street to the Farm Pond Connection, Beaver Street to Herbert Street, Herbert Street to Eames Street and Eames Street to Guild Road" (Exh. ASH-12, at 25). Similarly, Ashland concedes as shared pipes those pipes identified in Framingham's response to the Department's request for a list of pipes used to transport Ashland's sewage during dry weather conditions (Ashland Initial Brief at 12, citing DTE-RR-8). Namely, these pipes are:

SEGMENT	DIAMETER OF PIPE (in.)	LENGTH OF PIPE (ft.)
Bates Road to Eames Street	18	4250
Eames Street to Beaver Street	14	90
Eames Street to Beaver Street	18	900*
Eames Street to Beaver Street	24	1285*
Eames Street to Beaver Street	30	1510
Beaver Street to Waverly Street	30	50
Beaver Street to Waverly Street	42	3138
Farm Pond from Ashland Discharge to Bishop Street	36	3358
Bishop Street to Beaver Street	36	1075
	TOTAL	15656

* Indicates a pipe which is at least in part a parallel pipe (DTE-RR-8).

According to Ashland, none of the increased flows in the system that may lead to surcharging or the use of lateral lines are the result of increased flows from Ashland (Tr. 4, at 668-69). Ashland argues that it should not have to contribute toward the cost of capital projects along parallel or lateral pipes, because it has not seen evidence that the cause of overflows or backups into these pipes can be attributed to Ashland (Tr. 3, at 534, 536).

2. Analysis and Findings

We note that neither party disputes that Ashland's sewage is transported by (1) the Beaver Dam Interceptor from the Bates Road connection to Beaver Street, (2) the Farm Pond Interceptor from the Farm Pond connection to the Beaver Dam Interceptor at Beaver Street, and (3) the continuation of the Beaver Dam Interceptor from Beaver Street to the MWRA's facilities via Morton Street and Willis Street (Exhs. DTE-1, ASH-FR-1-2; DTE-RR-8; Tr. 1, at 150-54).[22] Ashland agrees that these pipes are part of the shared facilities (Ashland Initial Brief at 12, citing DTE-RR-8). Because Ashland concurs that the pipes that Framingham

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[22] The sewage that Ashland discharges at the Bates Road connection enters the start of the Beaver Dam Interceptor, which runs cross-country to Herbert Street (near Herbert Street's intersection with Eames Street), along Herbert Street to its end at Irving Street, then cross-country to Beaver Street to a point adjacent to the Dennison Playground (Exhs. DTE-1, DTE-F-1-3, att. A; Tr. 1, at 150-54). From this point, the sewage flows through a sewer to Morton Street, then in sewers along Morton Street, up Willis Street, across Waverly Street, and onward to the MWRA pump station at Arthur Street (Exhs. FR-16, FR-43; Tr. 1, at 142, 153).

The sewage that Ashland discharges at the Farm Pond connection enters the Farm Pond Interceptor, which runs to the intersection of Bishop and Waverly Streets, then flows to the Beaver Dam Interceptor at the point in Beaver Street adjacent to the Dennison Playground (Exhs. DTE-1, DTE-F-1-3, att. A; Tr. 1, at 150-54). From this point, the sewage joins the path described above.

identified in DTE-RR-8 transport Ashland's flow during dry-weather conditions, there is no dispute that the parallel pipes identified in that list, from Eames Street to Beaver Street, are also part of the shared system.

Framingham argues, however, that under certain hydraulic conditions, Ashland's sewage occupies additional pipes within the Framingham's sewerage system, such as sewers along Waverly Street, and that these pipes should also be included within the class of shared facilities (see Exh. DTE-F-1-31; ASH-FR-1-14; Tr. 2, at 262-64; Tr. 4, at 798-800). Although maintaining overflow capacity is integral to maintaining a reliable system, as Framingham argues (see Tr. 4, at 823-24), Framingham does not present sufficient evidence to demonstrate which additional elements of the system are necessary to support the transport of Ashland's sewage. Moreover, the record shows that obtaining more precise information about additional pipes through which Ashland's sewage flows would require the installation of meters and the collection of more data, which may vary seasonally and yearly, and the development of a computer model, tasks which Framingham acknowledges are costly and difficult (Tr. 2, at 253). Framingham did not present a definitive description of what constitutes the shared system under higher flow conditions.[23] Until the parties develop data necessary to evaluate the

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[23] The Department also agrees with Ashland that the fact that Framingham's demonstration that surcharging in the Framingham system has been coincident with alleged exceedances of the IMA discharge limits does not prove that Ashland caused the surcharges (Ashland Initial Brief at 13). Framingham did not provide sufficient information about its own flows during the same period relative to the total capacity of the system to support the conclusion that Ashland, and not Framingham, caused the surcharges. The data presented merely indicate that Framingham's system experiences problems during high flow conditions and that combined sewage from the two towns may back up during such circumstances.

system under higher flow conditions, we can draw no conclusion about pipes beyond the dry weather system.

Therefore, because the parties are in agreement that the subset of pipes listed in DTE-RR-8 is used by Ashland (Ashland Initial Brief at 12), and because the evidence about Ashland's use of additional pipes is insufficient, the Department finds Ashland must contribute a share of the capital cost for projects related to those facilities identified by Framingham in DTE-RR-8. These facilities shall include all structures that are appurtenant to the eligible pipe segments undergoing repair or replacement. See, e.g., Massachusetts-American Water, D.P.U. 95-118, at 56 (1996); Assabet Water Company, D.P.U. 95-92, at 6 (1996) (treating equipment or structures that are components of the same overall project as a single unit for cost recovery).

C. Recoverable Costs

There is no dispute between the parties regarding the classification of projects either as O&M projects or capital projects, nor is there a dispute about the types of costs that may be incurred in a capital project. Framingham states that it uses a minimum monetary threshold of $25,000 and a useful life of five years to distinguish capital projects from O&M projects (Exhs. FR-40, at 5; DTE-F-3-15). Ashland accepts Framingham's criteria for distinguishing between capital projects and O&M projects (Tr. 4, at 743). Framingham further explains that in calculating "actual construction costs" of a capital project, Framingham includes the costs of planning, engineering design, bidding, permitting, administration, resident services, general

construction, and debt service (Exhs. FR-2, at 6-22; DTE-F-3-13). Ashland did not contest the components of construction costs enumerated by Framingham.

The Department finds that the capital project thresholds are reasonable. Therefore, for the purpose of establishing which kinds of projects shall be eligible for cost sharing according to the capital cost allocation method described below, capital projects shall be defined as projects that cost in excess of $25,000 for facilities with an expected useful life of at least five years. Regarding the categories of expenditures that may be included in capital costs, the Department has typically allowed engineering and development costs. See Assabet Water Company, D.P.U. 95-92, at 8. Accordingly, the Department determines that Framingham may include all prudently incurred project-related costs, including, but not limited to, engineering, design, construction, resident services, and bidding, in the total capital cost of a project. Because the proposed formulas for allocating capital costs discussed below do not address any amortization of either the total cost or Ashland's share of the total cost, no debt service shall be included.

D. Allocation of Costs

1. Introduction

Both parties present methods for allocating capital costs that include Ashland's "maximum" or "peak" flow as a factor. The IMA uses the term "maximum rate of discharge" to describe the amount of sewage that Ashland may discharge to the Framingham system. The IMA restricts Ashland's discharge into the Farm Pond interceptor to "a maximum rate of discharge of 2.0 million gallons per day (or 1400 gallons per minute) . . . with the exception

that momentary discharge rates not exceeding 2.5 million gallons per day (or 1760 gallons per minute) for periods not in excess of five minutes are permissible . . . ." (Exh. FR-14, at § 1). The IMA restricts Ashland's discharge at the Bates Road sewer to a "maximum rate of discharge of 200 gallons per minute" (id. at § 2). The IMA does not provide for a higher momentary discharge rate for the Bates Road discharge.

2. Positions of the Parties

a. Framingham

Framingham proposes that Ashland's share of future capital expenditures be calculated based on the ratio of Ashland's momentary peak flow to the total peak flow through the pipe in question (Exh. DTE-F-4-3). Framingham explains that it uses a ratio of momentary peak flows, rather than daily maximum peak flows, because "capital improvements should be designed to ensure capacity for the peak projected flows permitted in the affected pipelines" (Exh. FR-37, at 31-32). Framingham explains that total peak flow should equal the design capacity of the pipe, which can be calculated by applying Manning's Equation to the sewer infrastructure and assuming "full pipe" flow (Framingham Initial Brief, att. A at 2).[24]

[24] Manning's Equation is a generally recognized engineering formula that relates the velocity of flow in a pipe to its geometry. It can be used to calculate a sewer pipe's capacity under full-flow conditions, using as inputs the diameter of the pipe, its slope, and a friction coefficient (DTE-RR-2, exh. A).

Framingham recommends that Ashland's peak flow be represented by the maximum allowed under the IMA (Exhs. FR-41, at 31; DTE-F-4-3; Framingham Initial Brief, att. A at 2).[25]

In the case of the Farm Pond connection, for which the IMA allows a momentary discharge rate that is higher than the maximum discharge rate, Framingham argues that the momentary rate should be used to represent Ashland's flow, because this is the quantity that Framingham must be able to accommodate (Tr. 1, at 179). Framingham indicates that a pipe with capacity insufficient to handle the momentary peak flow can cause backups that potentially would affect homeowners (id.). Thus, Framingham proposes that for purposes of capital cost allocation, Ashland's peak flows should be 2.5 MGD from the Farm Pond connection and 200 gallons per minute from the Beaver Dam connection (Framingham Initial Brief, att. A at 2).

Framingham opposes allowing Ashland any veto power over Framingham's wastewater infrastructure decisions, describing it as "unworkable" (Framingham Reply Brief at 23). In response to Ashland's concern that Framingham may want to improve or replace a pipe solely to provide itself with additional capacity, Framingham proposes a modification of its basic capital cost allocation approach (id. at 24). In instances where a larger pipe is installed to provide additional capacity needed only by one town, Framingham recommends that the two towns share in the cost of the capital project using the new ratio of peak flows resulting from

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[25] Framingham states that in the case of a need to increase capacity as a result of both communities needing to increase flow, the peak flow from each community would be determined by planning studies and investigations conducted by that community for its own needs (Framingham Initial Brief, att. A at 4). The Department notes that increasing Ashland's maximum allowable flow is outside the scope of this proceeding.

the increase in pipe size, with a "credit" based on the remaining value of the existing pipe granted to the town that does not need the additional capacity (id.). The value of the existing pipe would be based upon its remaining service life as determined under the provisions of Government Accounting Standards Board ("GASB") Statement 34 (id.).[26] This residual value would then be allocated to the two towns in proportion to their original peak flows, in the same manner as described above for a capital project not involving a change in pipe size (id.).

Finally, for pipes that are used by Ashland only intermittently, Framingham recommends that capital costs be shared in the same proportion as is applied to pipes serving Ashland's dry-weather flows (Tr. 2, at 295). Framingham notes that if Ashland increases flows beyond those specified in the IMA, such increases would have to be taken into account when apportioning the cost of capital projects (id. at 296).

b. Ashland

Ashland proposes that its share of capital costs be based on its proportionate share of the capacity of interceptor sewers that it uses, where the apportionment is in the ratio of Ashland's maximum daily flow to the maximum capacity of the pipe (Tr. 3, at 519, 644). Ashland states that pipe capacity is determined using Manning's Equation (id. at 520). To represent the maximum flow it contributes, Ashland proposes to use figures from the IMA, namely, 2.0 MGD for pipeline segments from the Farm Pond Interceptor to the point where it

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[26] Because neither party introduced the actual rule under GASB 34 into the record, and thus have not proven its content sufficiently for us to take administrative notice of the rule, we express no opinion on the proper method of calculating the remaining life of an asset under GASB 34.

joins the Beaver Dam Interceptor, and 0.29 MGD for segments along the Beaver Dam Interceptor to this intersection (Ashland Reply Brief at 25). For projects "after the point where the two interceptor sewers conjoin," Ashland proposes that its flow requirement be counted as 2.29 MGD (id.).

Ashland argues that it is not necessary to factor a five-minute, momentary peak discharge rate into the design of a downstream gravity sewer (Tr. 4, at 749). Ashland explained that the ramifications of not designing for this higher discharge rate would be that the receiving pipe would probably surcharge for a short period of time (id. at 749-50). However, Ashland stated that in the case of the Farm Pond connection, Framingham's downstream gravity sewer had been designed to accommodate the momentary peak discharge rate from Ashland (id. at 750).

Ashland proposes that it have "input into and veto power over" the spending for capital projects (Exh. ASH-12 at 28; Tr. 3, at 634; Ashland Initial Brief at 27). Ashland argues that it should not have to contribute to a project when a pipe replacement is conducted solely to provide increased capacity to accommodate growth in Framingham (Tr. 4, at 758; Ashland Initial Brief at 27).

3. Analysis and Findings

The parties are in basic agreement about the method for apportioning the costs of an eligible capital project. Framingham's term "total peak flow" is functionally equivalent to Ashland's term, "total capacity of the pipe." Both parties suggest the use of Manning's Equation as the means of calculating the capacity of a pipe. Manning's Equation relies on

objective data, namely, pipe diameter, slope, and pipe material, which would not be subject to dispute once the parties survey the facilities in planning future capital projects (DTE-RR-2, exh. A).

Both parties agree that the IMA specifies Ashland's capacity requirements, but disagree whether the maximum daily discharge rate or the momentary discharge rate is the appropriate figure to represent the discharge at Farm Pond (Framingham Initial Brief, att. A; Ashland Initial Brief at 25). Framingham favors using the higher, momentary discharge rate, because it better represents the peak capacity for which pipes should be designed. Ashland argues that the lower, daily maximum rate is appropriate because any surcharging of the system resulting from momentary higher rates of discharge would be of limited duration. The Department finds that because the pipes should be designed to accommodate peak flow, the higher momentary discharge rate is appropriate. See, e.g., Massachusetts-American Water Company, D.P.U. 95-118, at 44 (1996) (recognizing the need to design facilities to meet peak demand requirements under reasonable conditions).

Therefore, for the purpose of apportioning capital costs, the Department determines that it is appropriate to use the maximum allowable discharge rates to represent Ashland's capacity. Accordingly, the appropriate rates specified in the IMA are 2.5 MGD for the Farm Pond connection and 200 gallons per minute (288,000 gallons per day) for the Bates Road (Beaver Dam) connection. For facilities downstream of the confluence of Farm Pond Interceptor and the Beaver Dam Interceptor, at the point in Beaver Street near the Dennison

Playground, Ashland's share of capacity shall be the sum of these two figures, or 2,778,000 gallons per day.

Thus, the Department determines that the appropriate formula for calculating Ashland's share of the costs of a capital project is:

$$\text{Ashland Share} = \frac{\text{Ashland's Peak Flow}}{\text{Total Capacity of Pipe}} \times \text{Cost of Project}$$

where "Ashland's Peak Flow" is Ashland's maximum allowable discharge rate, and "Total Capacity of Pipe" is the capacity of the pipe calculated in accordance with Manning's Equation. We note, however, that there are at least two identifiable situations that would require modification to this basic formula.

The first situation would occur when Framingham undertakes a capital project in the Eames Street to Beaver Street area. Such a project would involve parallel pipes (see DTE-RR-8). Where flows can take either of two parallel paths, the appropriate "capacity" of the facility is the total capacity of both paths. If Framingham undertakes a project on one of those parallel pipes, "Total Capacity of Pipe" would be calculated as sum of the capacity of the pipe being repaired or replaced and capacity of the parallel pipe.

The second situation would arise where a larger-capacity pipe needs to be installed to accommodate increased flow from only one town. Framingham has proposed a method for allocating the costs of such an improvement by crediting the town not needing the increased capacity a share of the remaining value of the existing asset, which otherwise would not yet need to be replaced. This method is based on determining the remaining value of the existing asset, then allocating that value between the two towns in accordance with the ratio of their

original flows. The town not needing the new capacity would still be responsible for sharing in the cost of the project based on an updated flow ratio, but would be credited with its share of the remaining value of the existing pipe.

Framingham's proposed method for addressing increased flow from only one town is reasonable. Assuming that both towns will continue to use the shared facilities for many years, and that all facilities eventually will require significant repairs or replacement, the town not needing increased capacity will still benefit from the capital upgrades. In the absence of any need for increased capacity by either party, each town eventually would need to contribute to capital projects. The credit fairly compensates the town not needing additional capacity for paying its share earlier than would otherwise be necessary.

Accordingly, the Department finds that in the case in which a larger capacity pipe is built to serve the increased needs of only one town, both towns shall contribute to the cost of the new facilities as described above, with the town not needing additional capacity to be credited with its share of the remaining value of the existing facilities. The remaining value of the existing facilities shall be calculated in accordance with generally accepted municipal accounting practices.

IV. INSTALLATION OF PARSHALL FLUMES AND METERING DEVICES

A. Introduction

Section 4 of the IMA provides that, "[t]he Town of Ashland agrees to install a Parshall Flume at each point of discharge into the Framingham system, and to keep and make available at all reasonable times pumping station records" (Exh. FR-14, at § 4). Both parties describe a

Parshall flume as a structural device for measuring the flow of a liquid (Tr. 1, at 78, 85; Tr. 2, at 419).[27] Framingham claims that there are no operating metering devices at either discharge point (Exh. FR-37, at 13-14). Ashland acknowledges that there is no operating Parshall flume at the Farm Pond discharge point (Tr. 2, at 420). The MWRA currently measures Ashland's flow at the two pump stations in Ashland that feed force mains that discharge into the Framingham sewerage system (Exhs. FR-47, at 12; ASH-21). The parties dispute whether Ashland is obligated to install metering devices at the Parshall flumes located at the discharge points.

B. Positions of the Parties

1. Framingham

Framingham asserts that the IMA requires Ashland to install metering devices that will automatically record the flow from Ashland at the two points where Ashland discharges its sewage into Framingham's system (Framingham Initial Brief at 51). Framingham argues that Ashland should be responsible for the cost of installing and maintaining these devices (id. at 52). Framingham explains that an electronic meter can be installed within the flume to record the level of the wastewater or its depth of flow as it passes through the pipe (id.). Without such a meter, Framingham characterizes the flume as no more than a restriction in the pipeline (id. at 15). In response to Ashland's assertion that no electrical supply is available at

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[27] A Parshall flume is an open-ended, hourglass-shaped structure that is inserted along a pipeline to restrict the flow of wastewater to facilitate the measurement of flow (Exh. FR-37, at 14).

the Farm Pond connection to power such a meter, Framingham contends that Ashland could install a battery-powered metering device (id.).

Framingham claims that before discharging to Framingham's sewerage system, the pipeline from Ashland's Chestnut Street pumping station to the Farm Pond Interceptor runs below ground adjacent to a large body of water, making it vulnerable to groundwater infiltration (Exh. FR-37, at 13). Framingham asserts that because infiltration is likely along this segment, which is downstream of the MWRA meter in Ashland, the MWRA's flow data likely underreport the actual flow of Ashland sewage into Framingham's system (id. at 12; Tr. 1, at 93). Therefore, Framingham asks the Department to order Ashland to install meters and bear the costs of installing and maintaining them (Framingham Initial Brief at 52).

2. Ashland

Ashland acknowledges that the IMA requires it to install Parshall flumes at its two discharge points, but denies that the IMA requires Ashland to install metering devices (Ashland Initial Brief at 8-9; Ashland Reply Brief at 24). Ashland states its willingness to "comply with the letter of the IMA requirement that it install a Parshall flume device at the Farm Pond Interceptor Station" (Ashland Reply Brief at 25).

Ashland states that the only reason to install meters at the discharge points would be to capture any infiltration or inflow downstream of the MWRA meters (id. at 25). This is unnecessary, Ashland asserts, because downstream of the MWRA's meters, Ashland flows are conveyed by a combination of force main and recently rehabilitated gravity sewer (Exh. ASH-21; Tr. 3, at 527; Ashland Reply Brief at 26). Ashland explains that force mains

are not susceptible to infiltration because they are always full, and the pressure from the wastewater inside prevents groundwater from entering (Tr. 4, at 680). Ashland also states that there should be virtually no infiltration on the gravity section, because it was recently rehabilitated (Tr. 3, at 527-28).

Ashland states that no permanent source of electricity is available at either discharge point, making metering impractical (Exh. FR-ASH-1-10). Ashland proposes that on a semi-annual basis, it could "meter the last manhole at each discharge line prior to its connection with the Framingham [system] and then compare these discharge flows with both the MWRA numbers and its own pump rate numbers" (id.).

C. Analysis and Findings

The Special Act permits the parties to apply to the Department to determine the "proper and just sum" to be paid by Ashland to Framingham should the towns fail to agree. Special Act, § 1. The reviewable matters in dispute are the charges applicable beginning on December 9, 2003, and the method of determining "a proportionate share of the cost of maintaining [Framingham's] system" (Scope Order at 14; FR-14, at § 3). Thus, we review only whether meters installed at the Parshall flumes are necessary to our determination of the proper and just sum for Ashland's proportionate share.

Installing meters at the Parshall flumes would only be necessary for measuring Ashland's use of Framingham's system if the measured flow is shown to understate that use, due to groundwater infiltration between the MWRA measuring points and the Parshall flumes. A portion of the Farm Pond connection is a gravity sewer. A gravity sewer can be susceptible

to infiltration. Ashland has, however, recently rehabilitated that portion of the sewer (Tr. 3, at 527; see Exh. FR-37, at 13; Tr. 3, at 527-28).

The evidence of record is not sufficient to demonstrate significant infiltration between the pump stations in Ashland and the Parshall flumes. The only relevant evidence on infiltration that Framingham presented was testimony that the pipeline to the Farm Pond connection generally has a higher propensity for infiltration because of its proximity to Farm Pond. Framingham presented no specific evidence on the current condition of the pipes or the actual level of infiltration. Even though the IMA appears to assign the duty of installation to Ashland, Framingham at any time could have installed meters at the Parshall flumes, which are located in Framingham. Without specific evidence of the actual level of infiltration or the condition of the pipes, Framingham cannot quantify the difference, if any, between the MWRA's flow measurements and flow measurements at the Parshall flumes. In contrast, Ashland provided evidence that there should be virtually zero infiltration in the that section today (Tr. 3, at 527-28). Ashland's rehabilitation work suggests strongly that groundwater infiltration along the sewer lines between the MWRA meters and the points of discharge into Framingham's system is not likely significantly to augment flows at present or until the "proper and just sum" due to Framingham is once again up for review by the Towns.

Therefore, the MWRA's measurements are sufficient for measuring Ashland's use of Framingham's system for the current five-year period, beginning December 9, 2003. We find that meters at the Parshall flumes are not presently necessary for determining Ashland's use, and their future installation cannot affect the current record on which our decision must be

based. While infiltration theoretically will increase in the future as the section ages, the level of infiltration in the future does not affect our finding that, based on the record presented today, the MWRA's measurements suffice.[28]

Nevertheless, we note that the parties do not dispute that the IMA does require Ashland to install Parshall flumes at the discharge points (Exh. FR-14, at § 4). We observe that a fair reading of the IMA may well be said to obligate Ashland to install meters at the Parshall flumes, because Parshall flumes serve no purpose but to facilitate flow measurement. We decline, however, to order Ashland to install meters, because the Special Act does not confer to the Department the power to order specific performance of terms of the IMA. As we held previously, the Department cannot provide equitable relief in this case. Scope Order at 8. The Department is not the proper forum in which to seek such relief. Even if we had such power, requiring Ashland to install meters at this time would not affect today's decision (which is to determine the sum payable until the IMA's next renegotiation date), because they have not been shown to be necessary for measuring Ashland's use of Framingham's system during the current five-year period.

For future reference, one point needs to be noted. The Department's only statutory role is determination of the "proper and just sum" Ashland must pay for services from Framingham. The Special Act has been in force since 1946, and the present case is the first

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[28] The level of infiltration in the future, supported by evidence of the condition of the pipes, may be relevant to determining whether meters at the Parshall flumes are necessary in a future period. The IMA permits the towns to revisit the method of establishing Ashland's use of Framingham's system for future periods.

time either town has asked the Department to perform its statutory role. The Towns have always heretofore reached the kind of mutual agreement that the Special Act envisions. So it may well be that the present docket's dispute will stand alone. If, however, this dispute is presented once again some five, ten, or more years from now, and there is an issue of groundwater infiltration that could have been answered by installation of meters by Ashland, then adverse inferences about groundwater infiltration could be drawn from Ashland's failure to install meters to support a future claim that such infiltration is de minimis.

V. ORDER

After due notice, hearing, and consideration, it is

ORDERED: that all determinations regarding the scope of applicability of the 1963 Intermunicipal Agreement as set forth in the Interlocutory Order on Scope in this proceeding shall apply to any matters in dispute between the parties pursuant to St. 1946, c. 86, § 1, as amended by St. 1960, c. 406, § 1; and it is

FURTHER ORDERED: that the fair proportionate share of the cost of operating and maintaining the Town of Framingham's sewerage system to be paid by the Town of Ashland for the use of Framingham's facilities after December 9, 2003 shall be calculated according to the findings in this Order and the method set forth in Appendix A; and it is

FURTHER ORDERED: that the Town of Framingham may recover capital investment costs incurred in the future from the Town of Ashland in accordance with the findings in this Order and the method set forth in Appendix A; and it is

FURTHER ORDERED: that nothing in this Order shall be construed to preclude the parties from modifying the Intermunicipal Agreement by mutual agreement or entering into terms that differ from the determinations in this Order, but failing such agreement on modification or different terms, this Order represents a determination by the Department under the Special Act of "the proper and just sum which shall be paid by the Town of Ashland to the Town of Framingham," Framingham having properly invoked its right of application to the Department.

By Order of the Department,

/s/
Paul G. Afonso, Chairman

/s/
James Connelly, Commissioner

/s/
W. Robert Keating, Commissioner

/s/
Eugene J. Sullivan, Jr., Commissioner

/s/
Deirdre K. Manning, Commissioner

APPENDIX A

CALCULATIONS

This Appendix provides examples of the calculations described in this Order, for both annual O&M expenses and eligible capital projects.

Calculation of Ashland's Annual O&M Share

In Section III of this Order, the Department determined that the following formula should be used to calculate Ashland's proportionate share of Framingham's sewer-related O&M costs in a given year:

$$\text{Ashland Cost} = \frac{\text{Ashland Flow}}{(\text{Framingham Flow} + \text{Ashland Flow})} \times \text{Framingham O\&M Costs}^{29}$$

Using fiscal year ("FY") 2002 O&M expenditures and flow figures provided by Framingham (see Exhs. FR-4, DTE-RR-5; DTE-RR-6), the share of FY 2002 costs that would be allocated to Ashland is calculated as follows:

$$\text{Ashland Cost} = \frac{0.92 \text{ MGD}}{(6.55 \text{ MGD} + 0.92 \text{ MGD})} \times \$2{,}262{,}872$$

$$= 12.3159\% \times \$2{,}262{,}872$$

$$= \$278{,}693$$

Thus, based on FY 2002 O&M expenditures and flow figures, Ashland would pay Framingham $278,693. Framingham shall implement this formula in the same manner using the most recent year for which O&M expenditures are audited and using the corresponding flow data for that year.

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[29] Framingham O&M Costs = Total Costs - (Capital Expenditures + MWRA Fees). Total Costs include the major categories as listed in Exh. DTE F-3-12A, which include indirect "Overhead" costs included in Exh. DTE F-3-12B. MWRA fees are deducted because the Town of Ashland is independently assessed usage fees by the MWRA.

Allocation of Capital Costs

Section IV of this Order discusses the basic principle for allocating capital costs, as well as two special cases: (1) a capital project in an area in which there are parallel pipes, and (2) a capital project involving an increase in pipe size for the purpose of accommodating higher flow capacity for one town only. Examples of each case are presented below.

1. Base Case

The basic formula for calculating Ashland's share of the costs of eligible capital projects is as follows:[30]

$$\text{Ashland's Share of Project Costs} = \frac{Q_A}{Q_C} \times C_T$$

Where:

Q_A = Peak Flow from Ashland
Q_C = Design Capacity of Pipe
C_T = Total Cost of Project

The following hypothetical example illustrates the implementation of this formula:

Let Ashland's Peak Flow (Q_A) = 200 gpm
Let Design Capacity of Pipe (Q_C) = 1,000 gpm
Let Total Cost of Project (C_T) = $80,000

$$\text{Ashland's Share of Project Costs} = \frac{200 \text{ gpm}}{1{,}000 \text{ gpm}} \times \$80{,}000 = \$16{,}000$$

[30] Capital projects include, for example, such actions as repair, rehabilitation, replacement, and upgrades.

2. Parallel Pipes

In the case of a project performed on a pipe that is parallel to another eligible pipe, Ashland's share of project costs is calculated as follows:

$$\text{Ashland's Share of Project Costs} = \frac{Q_A}{Q_C + Q_{CP}} \times C_T$$

Where:

Q_A = Peak Flow from Ashland
Q_C = Design Capacity of Pipe
Q_{CP} = Design Capacity of Parallel Pipe
C_T = Total Cost of Project

The following hypothetical example illustrates the implementation of this formula:

Let Ashland's Peak Flow (Q_A) = 200 gpm
Let Design Capacity of Pipe (Q_C) = 1000 gpm
Let Design Capacity of Parallel Pipe (Q_{CP}) = 600 gpm
Let Total Cost of Project (C_T) = $80,000

$$\text{Ashland's Share of Project Costs} = \frac{200 \text{ gpm}}{1{,}000 \text{ gpm} + 600 \text{ gpm}} \times \$80{,}000 = \$10{,}000$$

3. Larger Capacity for One Town

This example assumes that Framingham is replacing an existing pipe with a larger one, so that it will have more capacity for its own discharge; therefore, Ashland is the party receiving a credit for the existing asset. Ashland's share of the new project would be calculated as follows:

$$\text{Ashland's Share of } P_V = \frac{Q_A}{Q_{Old}} \times P_V$$

$$\text{Ashland's Share of Project Cost} = \left[\frac{Q_A}{Q_{New}} \times C_T\right] - \text{Ash. Share of } P_V$$

Where

Q_A = Peak Flow from Ashland
Q_{Old} = Design Capacity of Existing Pipe
Q_{New} = Design Capacity of New Pipe
C_T = Total Cost of Project
P_V = Value of Existing Pipe

The following hypothetical example illustrates the implementation of this formula:

Let Ashland's Peak Flow = 200 gpm
Let Design Capacity of Old Pipe = 1,000 gpm
Let Design Capacity of New Pipe = 2,000 gpm
Let Value of Existing Pipe = $10,000
Let Cost of Project = $100,000

$$\text{Ashland's Share of } P_V = \frac{200 \text{ gpm}}{1{,}000 \text{ gpm}} \times \$10{,}000 = \$2{,}000$$

$$\text{Ashland's Share of Increased Capacity Project} = \frac{200 \text{ gpm}}{2{,}000 \text{ gpm}} \times \$100{,}000 - \$2{,}000$$

$$= \$10{,}000 - \$2{,}000$$

$$= \$8{,}000$$

Appeal as to matters of law from any final decision, order, or ruling of the Commission may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the Order of the Commission be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order, or ruling of the Commission, or within such further time as the Commission may allow upon request filed prior to the expiration of twenty days after the date of service of said decision, order, or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. (Sec. 5 Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).